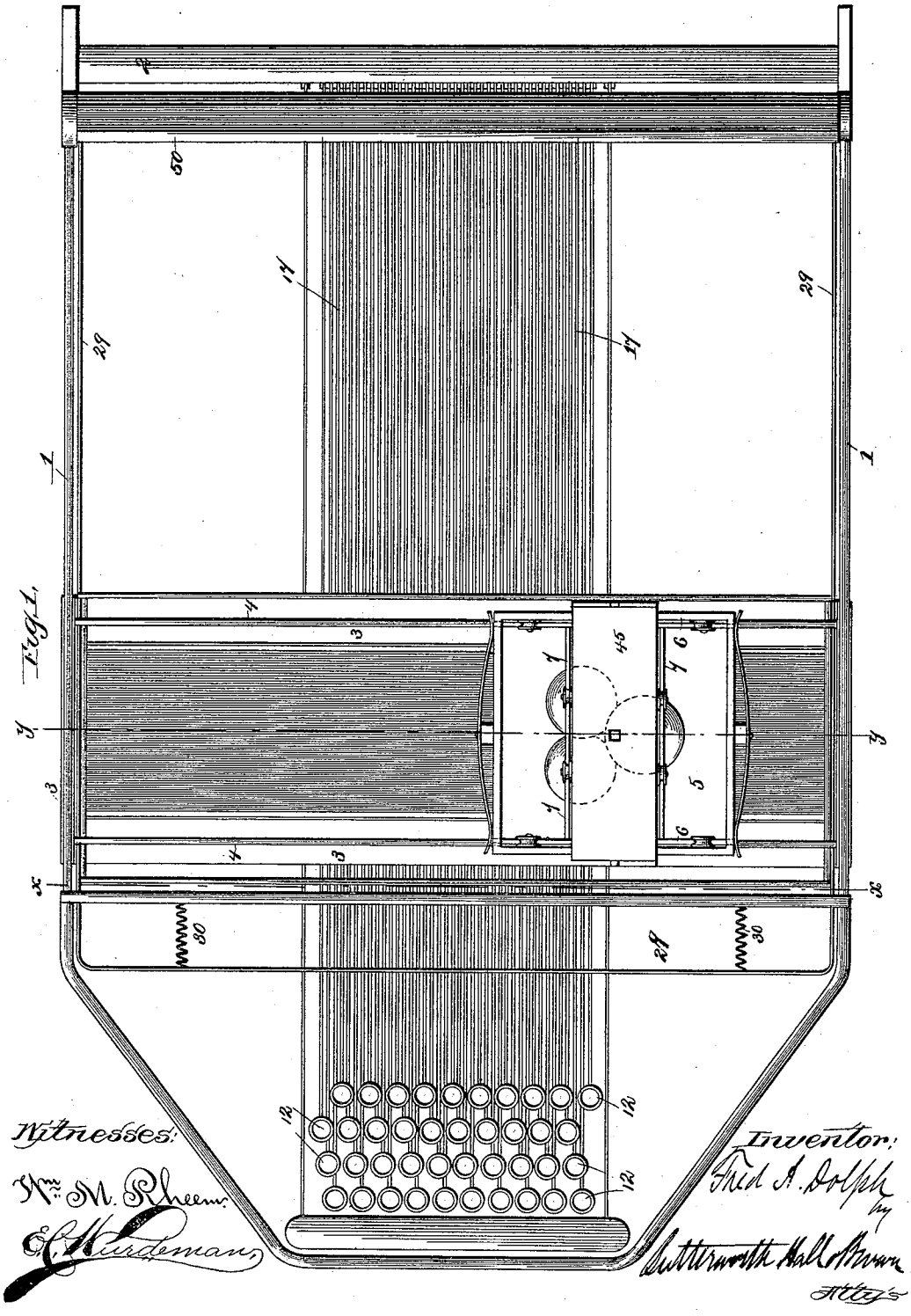
(No Model.) 7 Sheets—Sheet 1.

F. A. DOLPH.

TYPE WRITING MACHINE.

No. 457,308. Patented Aug. 4, 1891.



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(No Model.) 7 Sheets—Sheet 2.

F. A. DOLPH.

TYPE WRITING MACHINE.

No. 457,308. Patented Aug. 4, 1891.

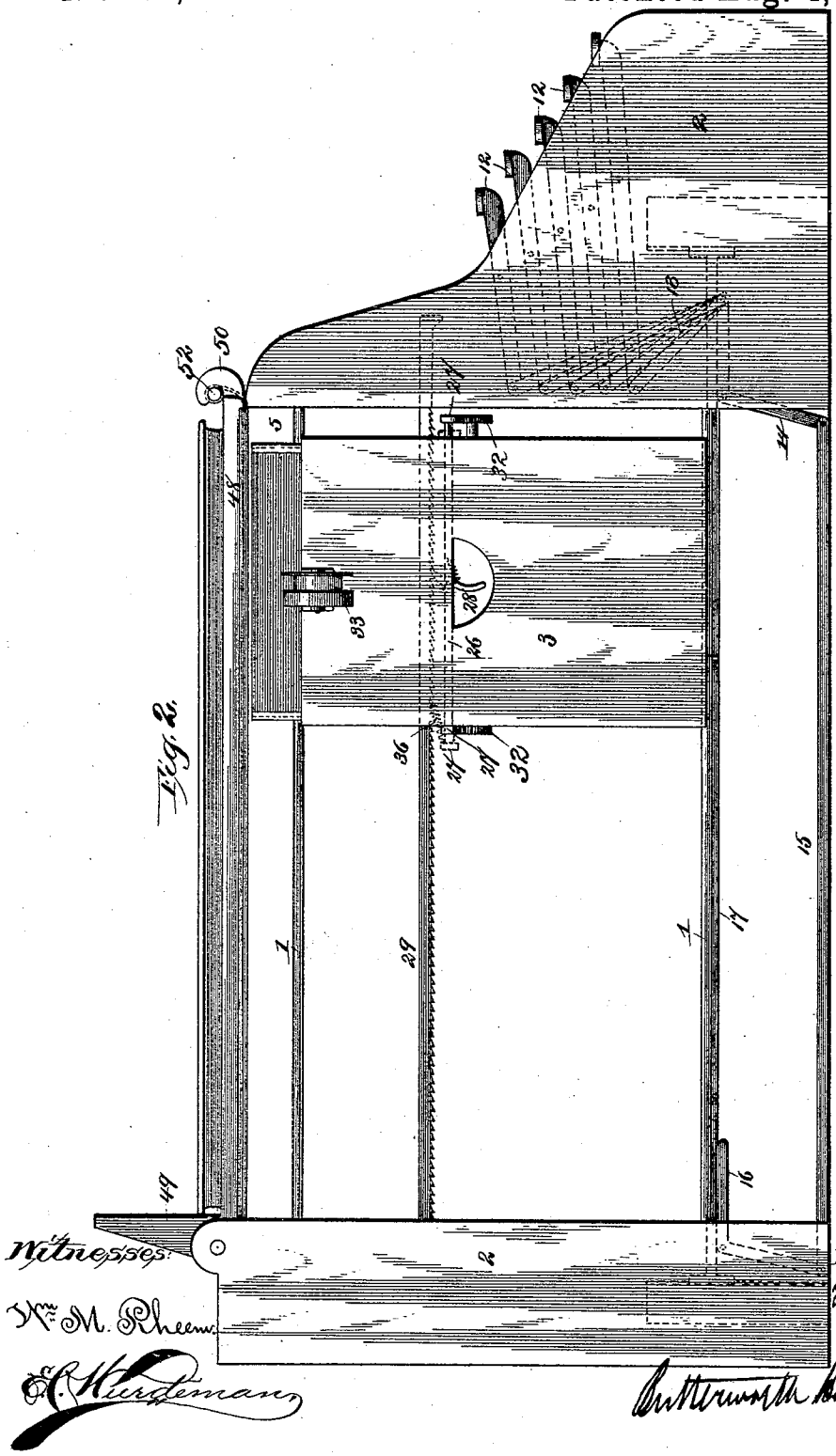


Fig. 2.

Witnesses:
Wm. M. Rheem.
E. C. Kierdemann.

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(No Model.) 7 Sheets—Sheet 3.

F. A. DOLPH.

TYPE WRITING MACHINE.

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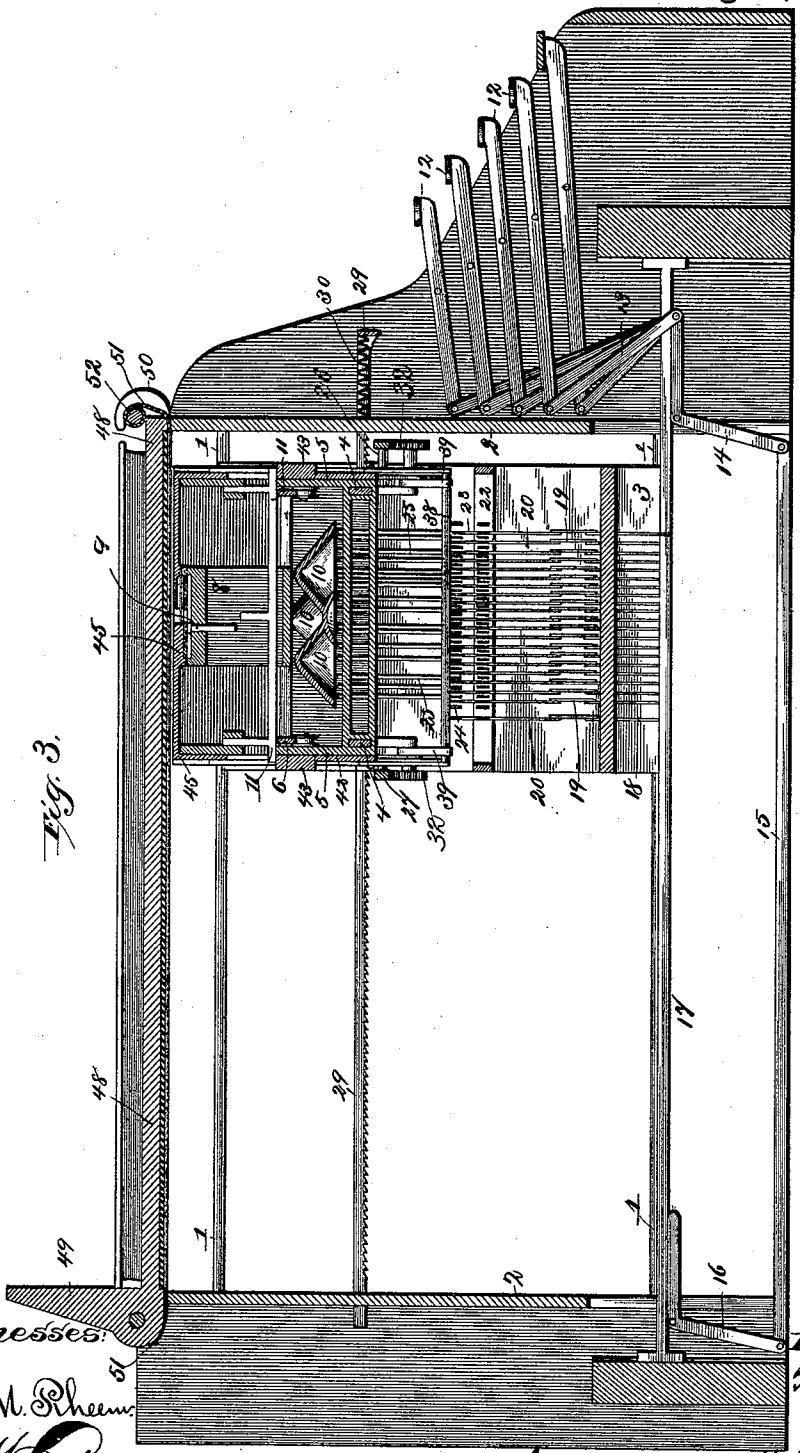


Fig. 3.

Witnesses:
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(No Model.) 7 Sheets—Sheet 4.

F. A. DOLPH.

TYPE WRITING MACHINE.

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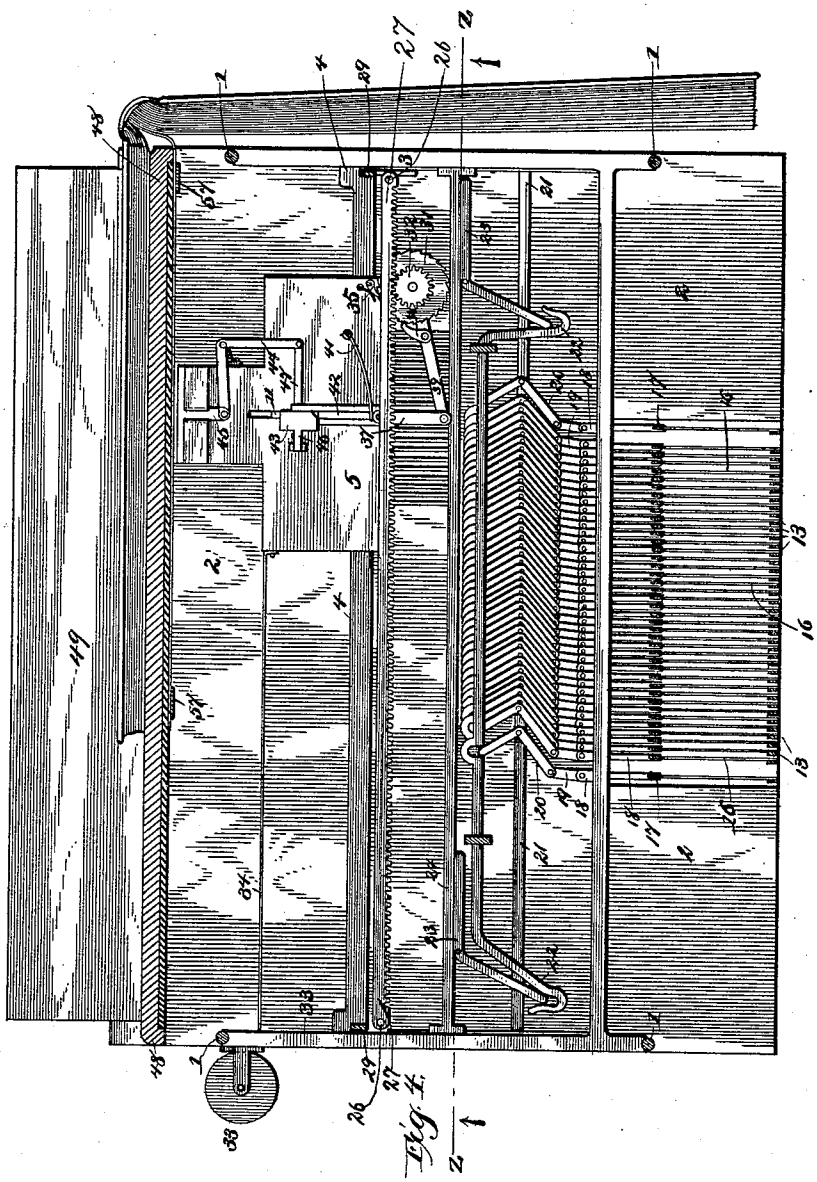


Fig. 1.

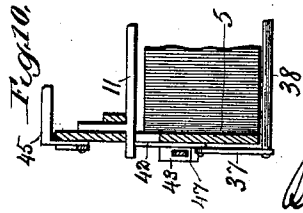


Fig. 10.

Witnesses:
W. M. Sheem.
C. Kurdeman

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(No Model.) 7 Sheets—Sheet 5.

F. A. DOLPH.

TYPE WRITING MACHINE.

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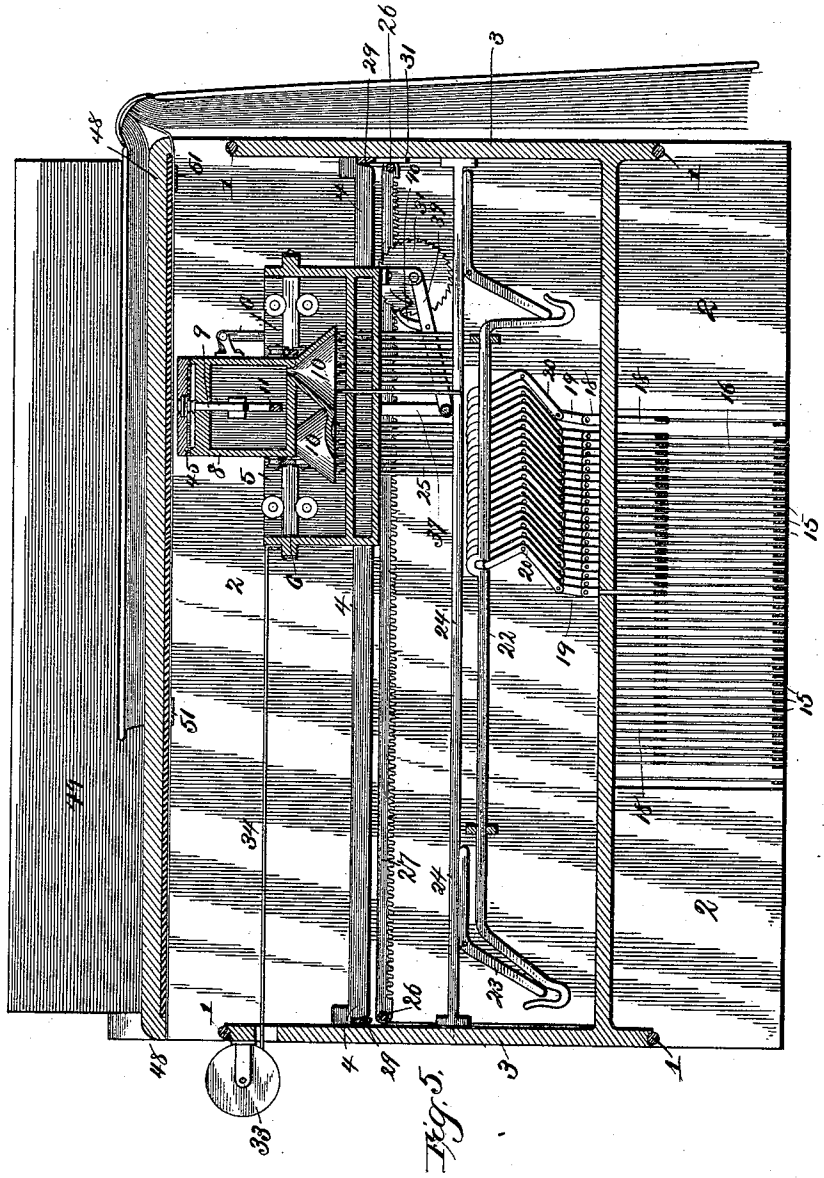


Fig. 5.

Witnesses:
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E. Wurdemann.

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(No Model.) 7 Sheets—Sheet 6.

F. A. DOLPH.

TYPE WRITING MACHINE.

No. 457,308. Patented Aug. 4, 1891.

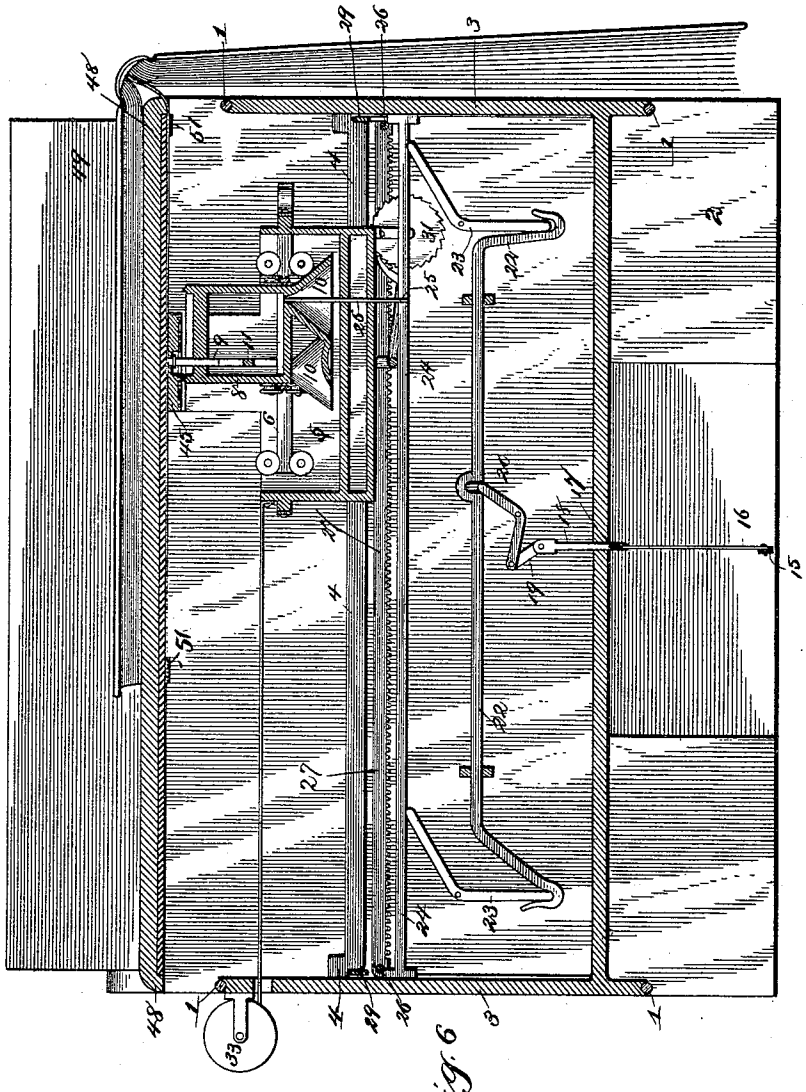


Fig. 9.

Witnesses:
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(No Model.)

7 Sheets—Sheet 7.

F. A. DOLPH.

TYPE WRITING MACHINE.

No. 457,308. Patented Aug. 4, 1891.

Fig. 7.

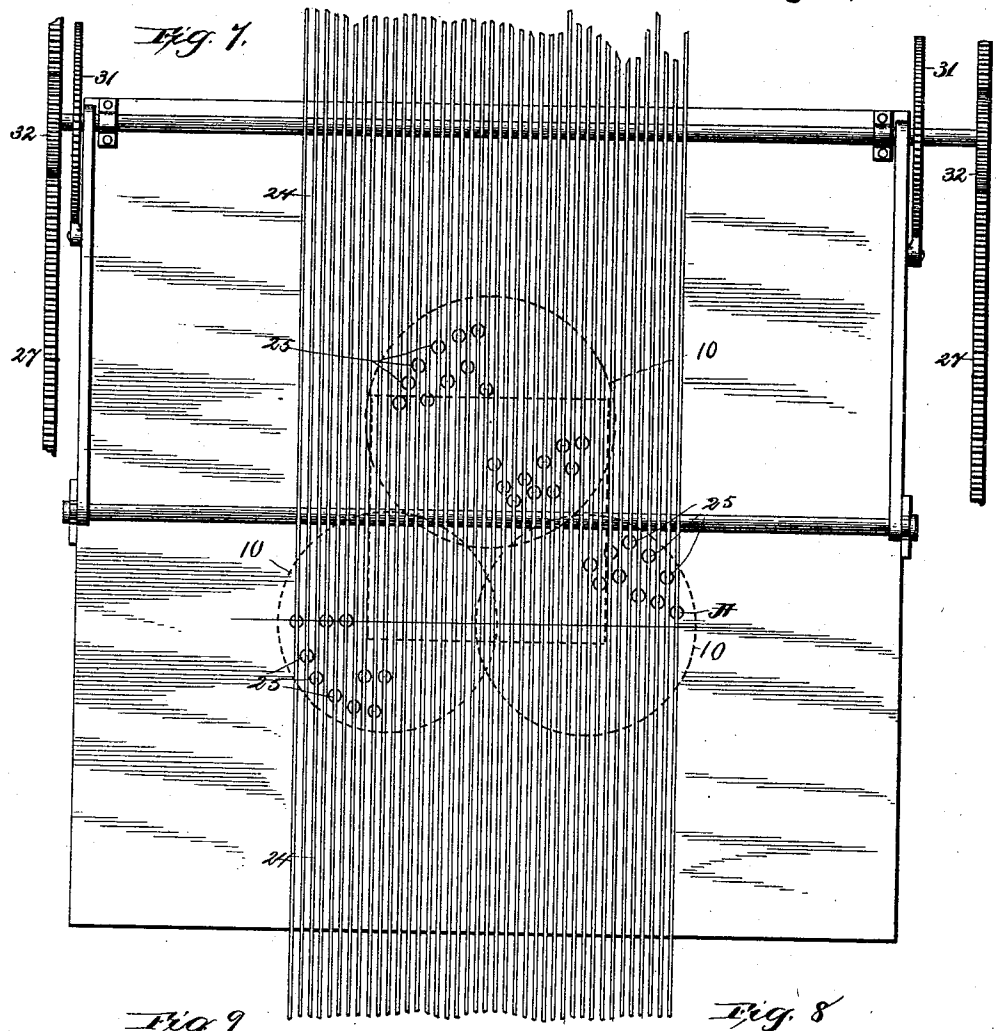


Fig 9

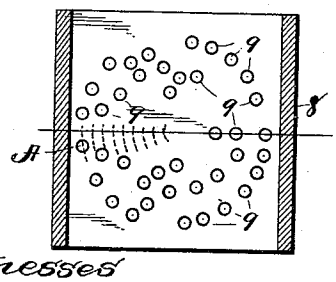
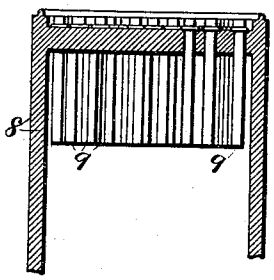


Fig. 8



Witnesses

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UNITED STATES PATENT OFFICE.

FRED A. DOLPH, OF AURORA, ILLINOIS.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 457,308, dated August 4, 1891.

Application filed December 4, 1890. Serial No. 373,522. (No model.)

To all whom it may concern:

Be it known that I, FRED A. DOLPH, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Type-Writing Machines, of which the following is a specification.

This invention relates to type-writing machines; and its object is to produce a machine adapted for writing in heavy books, such as record-books used in the offices of county clerks, court-houses, and similar places.

The invention consists in the construction and arrangement substantially as hereinafter described and claimed.

Like numerals designate the same parts in the several views in the drawings.

Figure 1 is a plan view of the machine. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal vertical section of the same. Fig. 4 is a vertical cross-section on line X X, Fig. 1. Fig. 5 is a similar view on the line *y y*, Fig. 1. Fig. 6 is a similar view to Fig. 5, except that the movable parts are in a different position, and for the sake of clearness certain of the parts are omitted. Fig. 7 is a view of the machine, looking upward from the line *z z*, Fig. 4. Fig. 8 is a vertical section of the type-block. Fig. 9 is a cross-section of the type-block. Fig. 10 is a detail view in section of the devices for operating the inking-pad and the hammer.

Rods 1 1 are longitudinally mounted in a main frame 2, one pair of rods near the lower portion of the main frame and the other pair of rods adjacent to the upper portion of such frame. These rods serve as ways and guides for a carriage 3, which will be designated as the "primary carriage." This carriage is designed to shift the printing mechanism from one line to another, and this is accomplished by arranging the page horizontally, with its length in the direction of the length of the machine, and arranging the primary carriage to move in the same direction. The mechanism for effecting the movement of this carriage will hereinafter be described.

Arranged transversely of the primary carriage are guide-bars 4 4, upon which are supported and guided a secondary carriage 5. The movements imparted to this latter carriage take the printing mechanism from the beginning to the end of a line and back again.

Mounted on the inside of the frame of the secondary carriage are sets of friction-rollers 5^2 5^2, the rollers of each pair placed a slight distance apart, so as to receive between them and guide the transverse bars 6 6, extending through openings in the ends of the carriage, to which transverse bars are secured the longitudinal bars 7 7.

A type-block 8 is provided with friction-rollers upon its outer side, which ride upon the bars 7 7 longitudinally of the machine. The type-block is hollow, but has a transverse head, through which play any desired number of vertically-arranged stems 9 9, which support the various kinds of type. To the under side of this type-block is affixed three or more conical guiders 10 10, which are hollow and have their mouths placed downward and their apexes provided with apertures opening into the interior of the hollow type-block.

Located within the hollow type-block and extending longitudinally across and outside the same is a hammer-bar 11 11, which is provided with a central short vertical projection which constitutes the hammer proper, and two longer vertical projections which slide in holes formed in lugs attached to the secondary carriage, all as most clearly shown in Fig. 3 of the drawings. The mechanism for operating the hammer-bar will be hereinafter described.

The machine is provided with a series of keys, the ends of which may be connected by links 13 13, the lower ends of which are joined to bell-crank levers 14 14, which latter are joined by connecting-rods 15 15 to bell-crank levers 16 16. The two sets of bell-crank levers 14 16 are parallel, and are arranged so that their upper arms rest in horizontal positions under the opposite ends of slide-bars 17 17, so that when a key is displaced a slide-bar is lifted, there being, of course, as many slide-bars as there are keys. Upon each slide-bar rests the forked lower end of a vertical piece 18, the upper end of which is jointed to the short link 19, which in its turn is pivoted to the lower arm of a bell-crank lever 20. All the bell-crank levers 20 20 are pivoted at their centers to a common bar 21. The upper arm

of each bell-crank lever 20 plays in an offset or recess formed in a rod 22, the two ends of which rod are bent and hooked in opposite directions, so as to be adapted each to operate a bell-crank lever 23 of a third set. The third set of bell-crank levers lift by a parallel motion a second set of slide-bars 24 24. A set of vertically-arranged directing-rods 25 25 have forked lower ends which fit loosely over the second set of slide-rods, and are thereby operated. The upper ends of the directing-rods may be rounded.

On opposite sides of the primary carriage and connected by a rod 26 are two rack-bars 27 27. The rod 26 fits loosely in the frame of the primary carriage, so as to be permitted to slide longitudinally therein. Affixed to the rod 26 is pawl 28, which points in the direction of the front of the machine.

A pair of ratchet-bars 29, joined by a common handle at their front ends, are mounted in the main frame and have their teeth pointing toward the rear of the machine and normally in engagement with the pawl 28.

Affixed to the under side of the secondary carriage are brackets which afford bearings for short shafts, which latter carry ratchet-wheels 31 31 and pinions 32 32. The pinions 32 32 are normally in engagement with the teeth of the rack-bars 27 27, before mentioned.

A drum 33 is attached at the side of the main frame nearest the edge of the book, as is shown in Figs. 6 and 10, and contains a coiled spring, which latter is fastened to one end of a cord. The other end of such cord is attached to the secondary carriage, and its tendency therefore is to draw such carriage (which contains the printing device) toward the beginning of a line in a book. This tendency, however, is checked by reason of the fact that a small dog 40, arranged upon the secondary carriage, engages the teeth of the ratchet-wheel 31 and prevents such wheel from rotating in the direction in which the teeth point, and as the pinion 32 is upon the same shaft with the ratchet 31 such pinion is also prevented from rotating in the same direction as long as it is in engagement with the rack-bars. If, however, the operator pushes in the ratchet-bars, the latter will push in the same direction the pawl 28, and such pawl, being secured to the sliding shaft 26, will cause the latter to slide in the direction in which the ratchet-bars 29 were pushed and therefore disengage the rack-bars 27 from the pinions 32. This is best seen in Fig. 2, where the full and dotted lines respectively represent the rack-bars 27 in and out of engagement with the pinions. When the rack-bars are thus disengaged from the pinions, the secondary carriage is free to move laterally of the machine, and consequently the spring and cord will pull such carriage across the page of the book to the beginning of the line or to any intermediate point.

A part of the same mechanism enables the operator to move the carriage up or down the page one or more lines at pleasure. To effect this function it is only necessary to insert a finger through the opening in the primary carriage, and disengage the pawl 28 from the ratchet-bar, and then slide the primary carriage back or forth on its ways toward the front or rear of the machine, and therefore toward the top or bottom of the page. This opening and pawl may be best seen in Fig. 2.

One or more small springs 36 are arranged with their ends connected, respectively, with the inner rack-bar 27 and with the frame of the primary carriage. When the operator pushes inwardly the ratchet-bars 29, they in turn, as before said, through the medium of the pawl 28, push the short shaft 26 and rack-bar 27 in the same direction, and as the latter is connected to the secondary carriage by the spring 36 such carriage is also drawn or pulled in the same direction, and consequently the printing devices are brought to a lower line on the page by this movement. Indeed by this movement both the primary and the secondary carriages have their positions changed, the former moving down the page a space or line and the latter moving across to the beginning of such line. This will be readily seen by a careful examination of Figs. 2 and 4 in connection with the above description.

Links 37 37 are arranged to slide in ways formed on both the outer sides of the frame of the secondary carriage, and the lower ends of these links are connected by a shaft 38, which rests upon and across the slide-bars 24, so that the movement of any one or more of these bars will lift the shaft and the links. Pivoted to this shaft and to the shorter shafts of the pinions are two arms 39 39, which carry hooked pawls 40 40, which latter engage the teeth of the ratchets 31 31, before referred to.

Flat springs 41 41 are fastened to the outside of the secondary carriage, and their free ends bear upon the upper ends of the links 37 37 and normally depress the same, and placed just above the latter and confined in the ways for the same are strips 42 42, which reach and contact with blocks 43 43. These blocks are comparatively thick and have extending horizontally from their opposite sides guiding-lugs 46 and actuating-arms 47, each of which is much thinner than the block carrying the same, as is shown in Fig. 10. The blocks are beveled upon their under sides for a purpose hereinafter to be specified. The actuating-arms 47 47 are connected to the lower limbs of bell-crank levers 44 44, the upper limbs of which are secured to and operate the inking-pad 45. The inking-pad is supported upon the upper extensions of the secondary carriage and suitably guided, so that it may move vertically with freedom. The inking-pad is smooth and solid on top, so as to firmly hold the paper when it is pressed up against it; but on its under surface has the soft ink-retaining surface usual to such pads. The center of the inking-pad is formed

with an aperture, through which the type pass in the act of printing. One of the key-levers is designed to operate the spacing devices, and is connected by links, bell-cranks, slide-bars, &c., just as are the other key-levers, except that there is no directing-rod placed upon the last slide-bar in this series, and instead such slide-bar contacts directly with the cross-shaft 38, and so turns the ratchets and causes the same to travel upon the rack-bars and carry with them the secondary carriage and the printing devices contained therein.

The machine is further provided with a book-support, which will be next described. Pivoted to the rear of the main frame is a book-support 48, which is preferably solid and has a projecting vertical ledge or foot-piece 49 and a curved recessed head-piece 50. The under surface of this book-support may be made of yielding material, such as rubber, and two or more elastic bands 51 51 are fastened at one end to the foot-piece or ledge and at their other ends extend around and are secured to a roller 52, which may be inserted in the concave of the head-piece, as is shown.

The construction of the several parts of the machine having thus been described the operation of the same will now be given. When the operator strikes one of the keys 12 12 bearing upon its face a particular letter or symbol, the outer end of such key is depressed, its inner end raised, carrying upward a link 13, and lifting the upper end of a bell-crank lever 14. This latter operation throws the arm of such bell-crank lever outwardly, and through the connecting-bar 15 causes a similar member of the bell-crank 16 to move outwardly and thereby throw upward its other limb. The upper members of both the bell-cranks 14 and 16 are arranged under the sliding bar 17, and therefore when they are elevated such bar is correspondingly lifted evenly and in the same manner at both ends. As has been explained, upon each of the slide-bars rests the lower end of a forked rod 18, and this may be termed a "loose straddling connection." When one of the slide-bars 17 is lifted, it projects upwardly a rod 18, which latter, through the medium of a short pivoted link 19, turns one of a second set of bell-crank levers 20 upon its axis and causes it to throw a bent bar 22 transversely of the machine, and thereby actuate a pair of bell-crank levers 23 23. Before continuing the description of this progressive operation further it may be well to digress in order to explain that the rods 18 are forked to adapt them to slide on the slide-bars when this action is made necessary by the movement of the primary carriage. The bell-crank levers 23 23 lift one of a second set of slide-bars, (marked 24,) and upon these bars 24 rest the lower forked ends of the directing-bars 25 and the cross-shaft 38. Consequently one directing-bar is elevated and the cross-shaft also lifted each time a bar 24 is operated. Now, looking at Fig. 5 of the drawings, it will be observed that when one of the directing-rods is lifted it will strike the side of the conical guider, and as the latter is secured to the type-block, which is movable both longitudinally and laterally, such conical guider and type-block will be moved by the directing-rod until the aperture in the guider is over the rod, and then the type-block will stop and be held in such position as is shown in Fig. 6. The type on the type-block are positioned so that the appropriate letter will always be over the hammer when the key-lever of the same letter has caused the directing-rod to move the conical guider and type-block the limit of its throw. It will be understood that this may be accomplished by adjusting each letter in distance and position with reference to the hammer in exact correspondence with the relative adjustment between the directing-rods and the apertures in the guiding-cones. Looking at Fig. 9, which represents the plan of the types, it will be noticed that no type is located in the center, and as this center is usually just over the hammer it will be understood that the position of a type with reference to the center is the same as with reference to the hammer. Select a type, (designated letter A,) and suppose it to be nine spaces from the center of the block and one space from the horizontal line passing such center. Looking at Fig. 7, it will be noticed that the centers of the circles there represent the apertures in the conical guiders, and if directing-bar A be taken it will be positioned so as to be nine spaces from the aperture and one space from the horizontal line drawn through such aperture. Now if directing-bar A is caused to strike the conical guider above it the center or aperture of the latter will be caused to move nine spaces to the east and one space to the north, supposing the top of the sheet to be north, and inasmuch as the type-block is carried by the conical guider the center of the type-block will also be caused to be moved nine spaces to the east and one space to the north, and this will move the letter A correspondingly, and therefore said letter will rest directly over the hammer, as shown in Fig. 6 of the drawings. While the type is thus being brought over the hammer, the strips 42 have pressed against the beveled edge of the blocks 43, (shown in Fig. 4,) forced them to move laterally out of the way, and then continued their upward movement until such strips have come into contact with the two ends of the hammer-bar 11 and have caused the latter to impel the hammer against the stem of the type and make the desired impression upon the paper. The arms 47 do not interfere with the movements of the strips 42, for they are thinner than the blocks 43, and there is a space behind them through which the strips may travel, as is shown in Fig. 10. This lateral movement of the blocks 43 carries with them arms 47 in the same direction and causes them to actuate the bell-

cranks 44, and consequently throw up the pad against the page to be printed upon and so hold said page evenly and firmly for the printing operation. At the same time the shaft 38 lifts the bars 39 and forces them to advance the pawls 40 several teeth, so that as soon as the upward stroke is completed and the printing accomplished the springs 41 depress the links 37, their connecting-shaft, and the arms 39, and make the hooked pawls 40 turn the ratchets and indirectly the pinions which travel in the rack-bars and cause the secondary carriage to move, so as to secure a space on the line between the letters. As is seen in Figs. 3, 4, 5, and 6 of the drawings, the book is arranged with the length of its page in the direction of the length of the machine and with the page being printed upon clamped to the under side of the book-support by the elastic bands. When it is desired to remove the book or to change the page, the rod 52 should be removed from the curved head-piece, which will loosen the bands, and the change desired can readily be made. The manner of changing from a higher to a lower line from the end to the beginning of a line and of spacing between the words was described while the mechanism for effecting these results was being set forth, and it is unnecessary to repeat.

It has not been attempted herein to state the variations and modifications of the several parts which can readily be made by any one skilled in the art, for such an attempt would make this specification unnecessarily prolix, and it suffices to say that I have herein set forth only the principle of my invention and the best mode which I have devised for carrying out that principle, and do not wish to be understood as confining myself to the exact mechanism shown and described.

What I claim, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination of a hollow block carrying the type and having a universal movement in the plane of of its base, mechanism for such movement, a hammer for projecting the type within such block but supported and actuated independently thereof, and mechanism connected with the keys for actuating the hammer, substantially as and for the purpose set forth.

2. In a type-writing machine, the combination of a type-carrier having a universal movement in the plane of its base, conical guiders affixed to such type-carriers, and directing-rods, each connected with a separate key-lever, whereby it may be projected into a conical guider and cause the same to move the type-carrier, substantially as and for the purpose set forth.

3. In a type-writing machine, the combination of a hollow type-carrying block, a hammer extending into such block but actuated independently thereof, conical guiders affixed to such block, and directing-rods, each connected with a separate key-lever, substantially as and for the purpose set forth.

4. In a type-writing machine, the combination of set of types mounted in a carrier having a universal movement, conical guiders affixed to such carrier, and a set of directing-rods, each connected to a separate key-lever and each positioned with reference to the apex of its conical guider correspondingly to the positions of a type-letter with reference to the center of the carrier, substantially as and for the purpose set forth.

5. In a type-writing machine, the combination of a hollow type-carrying block having a universal movement in a horizontal plane, a hammer-bar independently supported but having its hammer portion within the confines of the hollow block and under the center of the group of the type when the block is at rest, conical guiders affixed to such block, and directing-rods, each connected with a separate key-lever and positioned with reference to the apex of a conical guider correspondingly with the position of a type-letter with reference to the center of the group of type-letters, and a hammer thereunder, substantially as and for the purpose set forth.

6. In a type-writing machine, the combination of a work-support, an inking-pad having an aperture continuously therethrough, laterally-moving type devices for projecting the type through the aperture, and mechanism for lifting and holding the pad against the paper on the work-support, substantially as and for the purpose set forth.

7. In a type-writing machine, a work-support hinged thereto and having a recessed projection at one end, in combination with the elastic bands secured at one end to the foot of the work-support and at the other end to a rod adapted to rest against the recessed projection, substantially as and for the purpose set forth.

8. In a type-writing machine, the combination of a work-support having a projecting ledge at its foot and a recessed projection at its head with elastic bands fastened at one end to the foot of the support and at the other end to a roller which is designed to normally rest in the recessed projection and thus keep the bands stretched across the face of the support, substantially as and for the purpose set forth.

9. In a type-writing machine, the combination of a plurality of carriages containing the printing mechanism and sliding joints between the same and the key-levers, substantially as and for the purpose set forth.

10. In a type-writing machine, the combination of a carriage resting upon ways, and pinions whose journals have bearings in such carriage, of rack-bars normally in engagement with such pinions, and mechanism for disengaging said rack-bars from such pinions, substantially as and for the purpose set forth.

11. In a type-writing machine, the combi-

nation of a carriage resting upon ways arranged longitudinally of the machine, a work-support for holding the page in the same direction, rack-bars, and a spring connected to such bars and to the carriage and serving when it is extended to shift the carriage and printing mechanism from a higher to a lower line upon the page, substantially as and for the purpose set forth.

12. In a type-writing machine, a primary carriage arranged upon ways formed upon the main frame of the machine, a pair of rack-bars joined by shafts journaled to slide in the frame of such carriage, which shafts are provided with pivoted pawls, ways arranged in such carriage at right angles to the ways first mentioned, a secondary carriage resting upon the last-mentioned ways and carrying pinions which normally mesh with the rack-bars aforesaid, in combination with connected ratchet-bars, the teeth of which engage the pawls on the shafts, springs for normally pressing the ratchet-bars outwardly, and a spring-drum having a cord secured to the secondary carriage, whereby when the ratchet-bars are pressed inwardly the rack-bars are caused to slide in the frame and disengage their teeth from the pinions and thereby permit the secondary carriage to be drawn back to the beginning of a line, and at the same time the primary carriage will be forced in the direction of movement of the sliding rack-bars and will thereby shift from a higher to a lower line on the page, substantially as and for the purpose set forth.

13. In a type-writing machine, a primary and secondary carriage respectively movable upon sets of ways at right angles one to the other, devices for moving such carriages at will, a hollow type-block carrying a group of type, and also conical guiders, a hammer-bar supported and actuated independently of the type-block but having its hammer proper under the center of the group of type when they are in their normal position, a set of directing-rods, each of which is connected to a separate key-lever and is positioned correspondingly to a type in the type-block, and suitable mechanism for connecting the key-levers with the directing-rods, substantially as and for the purpose set forth.

FRED A. DOLPH.

Witnesses:
E. C. MERRILL,
A. G. WATERMAN.